Women's Work in War Time

Textile Department

The Merchants National Bank

28 State Street

Boston

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Premier Lloyd George: "Woman's work in the war has been a vital contribution to our success. It would have been impossible to produce that overwhelming mass of ammunition at the Somme had it not been for the work of the women. They have shown a devotion, a zeal, a courage which are beyond challenge."

Monsieur Pierre Flandin: "What French women have done to keep the courage of the nation during the dark days cannot be measured in words. They have been the backbone of national defence."

Signor Sacchi, Italian Minister of Justice, presenting to the Italian Chamber a bill the object of which is the abrogation of every law which in the field of civil and commercial rights, curtails the capacities of women; "An act of justice, of reparation almost—to which women now have more rights than ever."

M. Tardieu, French High Commissioner, recently stated: "There is no line of mechanics in which our women have not become proficient since the men have gone to war. And surely what French women have done American women can do."

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By

W. IRVING BULLARD

Manager Textile Department

The Merchants National Bank

28 State Street, Boston

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WOMEN'S WORK IN WAR TIME

"MAN POWER" is rightly accounted one of the decisive elements in the world war. But "Woman power" also must be included in any survey of the myriad forces enlisted in the tremendous conflict.

Such a war, summoning all the energies of nations, has revealed to the belligerent powers a huge reservoir of latent human energy in their women, and even their children. Woman in the harvest fields had before now been a common sight in Europe; but to-day her toil has been almost infinitely multiplied in amount, scope and in its sources of social origin. What Europe has achieved, and what mistakes Europe has made, are to-day of keen interest to the employers of America, now that we are ourselves in the war and are facing a steadily growing shortage of labor.

The "dilution" of industrial labor in Europe through the advent of women workers is now a commonplace. Women are not only the harvest hands, but to a large degree the munitions makers, and in a host of the common processes of industry they have taken over vocational tasks that were generally assumed to be capable only of masculine performance. In manufacturing, transportation, commerce and finance the

female fraction of the payroll has increased steadily to large proportions. The possibilities and the limitations alike revealed by this new order of things possess much significance for the American business man.

In England to-day about 1,256,000 women have undertaken work formerly done almost wholly by men, raising their employment total from about 3,282,000 to 4,538,000. This total employment does not include domestic servants, women in small shops or on farms, or nurses in military, naval or Red Cross hospitals. Slightly over 200,000 are now engaged in agricultural labor. Still more are employed in the great war-time industry of munitions-making. How vast that industry has become is indicated by the fact that the ministry of munitions is now employing 2,000,000 persons and is spending nearly $3,500,000,000 a year.

The degree to which the range of munitions work by women has spread beyond purely unskilled labor is indicated by the following official advertisement carried in October issues of British newspapers:

MINISTRY OF MUNITIONS

Educated Women Wanted for Training

The Ministry of Munitions invites applications from women of education for training in Engineering Work involving accuracy and a certain degree of skill. There are many openings in Aircraft and other Factories doing urgent Government work.

Applicants should be between the ages of 18 and 35.

not less than 5 feet 2 inches in height, and of good physique.

Maintenance grants are payable during training and railway fares allowed to those living at a distance. Lists of suitable lodgings are available.

The extent to which women have entered munitions work in Great Britain was brought out on the recent visit of the King and Queen to Scotland, when the Queen inspected munitions works and living quarters in the famous town of Coventry, the 140,000 inhabitants of which now include 40,000 girl and women workers.

Putting millions of men into the field, out of a population of 46,000,000, naturally meant a great diminution and derangement in the British labor supply. As early as December, 1914, the loss of male help in ten leading industries had been 12.6 per cent, and in most cases that figure has since been trebled or quadrupled. The ratio of unemployment among trade union members was 7.1 per cent in August, 1914, and for many months recently has been practically zero. From the British mines, despite some recalling from the trenches, over 170,000 recruits have been taken.

The same process of substitution of female for male labor has naturally been even more marked in Germany, where in several major industries the proportion of total work done by women has risen from slightly under 18 per cent in 1914 to practically 60 per cent in 1917. In the past three years the number of women employed in the German metal trade has increased 325

per cent. France also now depends largely upon her women in the factories as well as on the farms.

How hard many British enterprises have been hit by the war service is interestingly indicated in a very recent issue of the London Economist wherein there happened to be printed in succession three financial reports each stating incidentally their losses in working staff. Dorman, Long & Co., steel and coal, report that 3825 of their men joined the colors, of whom 264 were killed and considerably more were wounded; Spillers & Bakers, Ltd., millers, report that 1158 of their men went to the war, of whom 51 had been killed and 90 wounded; and the British Thomson-Houston Co. reports 1309 enlisted, 152 killed and 138 wounded. On the British railways the number of female workers has increased during war time from 11,000 to nearly 60,000.

Practically universal tribute has been paid in Great Britain to both the spirit and the capacity of the women workers in war time, their zeal and their deftness in a host of crafts being a subject of general comment. Dr. Wm. Garnett writes in "After-War Problems": "We have trained women to become skilled at mechanical trades which no woman had touched before, and an intensive system of training has revealed that we have tapped an almost limitless amount of emergency labor capable of doing what had hitherto been a trade mystery." Very recently Mrs. Lloyd George remarked: "Women are now doing highly skilled work. When I was in Dundee the other day I

found nearly all the work done by young women and boys who were cheerful and happy, and were provided with a beautiful canteen for meals and rest."

Dr. Addison, former Minister of Munitions, said lately in Parliament: "The widespread employment of women has been attended with singularly little difficulty. From 60 per cent to 80 per cent of the machine work on shells, fuses and trench warfare supplies is now performed by women. They have been trained in aëroplane manufacture." The British attorney general, Sir F. E. Smith, also said in Parliament: "The contribution which women have made to the support and maintenance of the state was as necessary as that of the men themselves. A million women have taken the places of men, and when we return to the ways of peace it will be impossible to recreate industrial and social conditions unless we provide for reconciling women's labor with men's labor in all sorts of new directions."

As illustrating the adaptability of women workers, an optical training school for women has lately been operated by the British ministry of munitions in which excellent technical results have already been obtained, girls from 16 to 20 proving the best students in this enterprise of establishing a trade formerly monopolized by the enemy.

The extent to which educated women are being drafted into British home war service is evidenced by the call on October 3 for 1000 women wanted at once to train for engineering and other advanced forms of work in munitions factories:

The training section of the Ministry of Munitions is providing free instruction in machine work (general and more advanced), oxy-acetylene welding, aeroplane-woodwork, optical instrument work, draughtsmanship, electrical work, and core making.

Instructional workshops have been set up in London, Birmingham, Bristol, Luton, and Manchester and other training centres have been established in 12 metropolitan areas and in 24 country districts, as well as in four centres in Scotland. An appeal is made to women of good physique, and between the ages of 18 and 35, to offer themselves.

How far the general idea of supplementing masculine by feminine effort has gone in Great Britain is evidenced by the recent formation of the Women's Army Auxiliary Corps, with distinctive uniform, designed to employ women in semi-military functions on both sides of the Channel wherever a soldier may thereby be relieved for more active war effort. Such women volunteers are to be used as officers' and sergeants' mess clerks, tailors, cooks, librarians, storekeepers, shoemakers, orderlies, waitresses, butlers, bakers, checkers, packers, for unskilled labor, in motor transport, telephone and postal services, and in technical capacities with the Royal Flying Corps and Army Service Corps. The women enlist for a year or duration of the war, whichever is longer.

Naturally, however, all has not been smooth sailing in these new experiments, and American employers may hope to profit from the mistakes as well as the achieve-

ments recorded abroad. The chief blunders appear to have been in not adequately recognizing feminine physical limitations — mainly along lines later specified herein, — in some degree of exploitation by individual and governmental employers, and in failure to provide clearcut governmental supervision of the new regime.

As recently as within two months complaint has been made by the National Federation of Women Workers that in addition to the perplexity caused by a multiplicity of orders, hardships have been imposed on women munitions workers by frequent layoffs for considerable periods without pay, some of these workers being far from home; complaint also was made of too few railway holiday passes, some women not having been home since the war started.

Within a few weeks Henry Bentinck, M.P., complained in the London *Times* that the munitions ministry was still "sinning against the light" in keeping women to a 10½ hour day, despite the finding of its own experts. It had been established that for women on moderately heavy labor 56 hours was the maximum required to obtain the maximum output, and for light labor 60 hours; and that a week of 50 hours produces as large an output as a week of 66 hours, and considerably more than a week of 77 hours. Further, it was alleged that many firms were still able to get permits to employ girls of 16 to 18 on night work, formerly forbidden by the Factory Acts. From union sources it is cited that night work was at first for a time universal, the weeks being seven days with only

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one Sunday off per month, and that in some factories 30 consecutive nights were worked.

Another criticism has been the confusion in regulation resulting from conflict and overlapping of authority. Labor has been variously under the control of the ministry of labor, the ministry of munitions, the admiralty, the board of trade, the department of shipyard labor, the national service department, the board of agriculture, the home office, the board of education and the war office. The ministry of munitions alone has had 50 separate departments, lately whittled down to 10. General coördination on the labor problem is under way, following reports from eight sections of the kingdom on the grievances or discontent of labor. The situation has been recognized by Lloyd George in the following words: "There is no doubt at all that in the bustle and drive needed to produce a great output in a hurry, because time costs so much, a good deal happens which requires to be put right. I hope as a result of investigations by a series of commissions that steps may be taken to remove any grievances which still exist."

There may be a cue here for American employers against excesses or indiscretions in utilizing female labor. That the process will be watched jealously by organized labor is evident from the following recent quotation from the American Federationist:

> "In Cleveland between 75 and 100 women are running Bradley hammers in one shop. Women are wiping engines in the running house at Akron, Ohio; many are running engines in the machine

shops and doing other laborious work around large manufacturing plants. One woman has been employed by the Baltimore and Ohio railroad as a shop hand; she packs journal boxes, which are on the axles of wheels and must be filled with waste and oil. Flag women have appeared on railroads. Women are employed in the foundry trade, in machine shops and munitions plants. One lumberyard in Chicago is reported to be employing women to handle lumber. Truly there can be no justification for employing women with so little discrimination. We cannot disguise the fact that during the progress of the war women may be employed in constantly increasing numbers, but surely our nation has enough intelligence to see that women are not employed in handling Bradley hammers and doing the roughest sort of manual labor for which they are physically unfit."

As further developed by particulars given later, the matter of inspection and welfare supervision is one which deserves the employer's best attention. The war has taught English business many lessons, notably the value of research work and of technical training; and among the numerous investigating committees on such subjects has been one on welfare work — particularly among women and children — headed by Prof. Ashley of Birmingham University. It recommended, briefly, that welfare supervisors acquire the equivalent of social study courses now being given in several of the British city universities, comprising industrial history, social economics, trade unionism, conciliation and arbitration, sanitation, hygiene, first aid, industrial law, business

organization, etc., and that at least half the training be observation and practice work. In England, largely as a result of female employment, welfare work has attained proportions undreamed of a few years since.

In the United States as yet merely the fringes of the subject have been touched, and often more as a matter of project than of performance. If the war continues many months, however, it will become a lively topic, and such matters as welfare work, woman's safe working dress, readjustments of machines, movements, etc., shop rearrangement, regulation of hours, canteens, etc., will become commonplaces of business discussion as they have in England.

The call upon American industries to-day is not only to supply our own Government with equipment, but also the military needs of our allies and the civilian requirements of nearly all nations. It has been said that for every man in the trenches twenty men are required behind the lines to provide the supplies to carry on war. The selective draft, the decrease in immigration, and the vacant places of those who have entered Government service have caused additional gaps in our supply.

The railroads, operating under their new coöperative efficiency, have been perhaps the pioneers on this side. The Penna. R. R. system is now employing nearly 2500 women in a great variety of what might be termed accessory employments, including some departments of shopwork. The Baltimore & Ohio R. R. Co. has met with notable success in this latter respect. On

the other hand, some of the trunk lines have found it largely futile to expect women to stand up under section gang work.

In general industry the opportunities for female employment in this country should make especial appeal to American ingenuity and management talent. The government itself is here pointing the way. The war and navy departments — especially the latter with its "Yeowomen" — which before the war frowned on all employment of women, are now emphatically favoring their appointment to clerical positions.

In fact, the various administrative branches of the national government are now considering a definite program for feminine "dilution of labor"; and in connection with general plans for possible "conscription" of workers for necessary war work employment, a nation-wide labor census is being taken, in which women are included.

Wall Street has been even quicker than the "City" district of London to recruit women to fill many hundreds of positions made vacant by enlistment and the draft. In Boston, to instance but one city, young women are now conspicuous in the running of certain department store elevators, in charge of certain soda fountains, and in the operation of one large shoe-shining establishment. The Massachusetts and other trolley lines, taking a leaf from the British tramways, have made their plans for feminine employment in sundry capacities. And we are probably only at the opening of the chapter.

WELFARE WORK IN WAR TIME

SINCE the subject of this brochure largely relates to the arduous and dangerous duties now being performed by women in various industries of England, and to some extent in this country, and in further anticipation of serious labor shortage in America and woman's advent into occupations heretofore unhesitatingly termed as next to "absolutely impossible," welfare work and safety devices which have been instituted and adopted are timely topics for discussion.

In the United States women have entered many branches of industrial activity, but it must not be assumed that all this has been successfully accomplished without considerable reorganization and betterment of conditions generally. Not only must the question of employing women be dealt with but the reorganization necessary because of it must also be given consideration and despatch. It is not physically possible for women to enter the various employments, for years conducted by men, without some changes. The advisability of a change in raiment is one of the first important features to be considered. For three reasons the bloomer costume is most necessary: (1) Economy, (2) Sanitation, (3) Safety. Women of to-day in industrial occupations insist upon adorning themselves in flowing skirts, flimsy shirt waists and impracticable footwear. All this must

be eliminated because of our modern mottoes of "safety first" and "cleanliness." England has adopted almost universally the bloomer costume for women, and women have been generally willing to wear a garment which because of its manifestly safe and sanitary construction won favor for itself. In America many concerns have been endeavoring for some time past to encourage its adoption and continue to have the matter under advisement, but it has met with refusal on many sides. Women and girls seem to fear they will lose the respect and regard of the opposite sex almost entirely if clad in such a garment. On the other hand it is confidently felt that if drafts are continued and women are obliged to respond to industrial necessity here in America, as they have been in England, they will, when working together in large numbers, feel free to use the costume intended to promote their welfare from every standpoint. Various styles of costumes are being produced, but the one most practical from the writer's point of view is in use in England and consists of a long bloomer and blouse with a detachable skirt. A costume of this design eliminates the time which would ordinarily be consumed at the factory for changing in the morning and evening. The blouse is made with a pretty collar and cuffs, with short sleeves, if for use around liquids, or long sleeves tapering from the elbow and buttoning closely at the wrist so that no surplus cloth is left to catch in machinery. The bloomers can be pulled up to the knee and the full, well-fitting skirt buttoned on and they are ready for the street, just as

attractive as the girl scout costume now in vogue. These garments are made from cambric, gingham, chambray and other inexpensive and easily laundered materials of a color suitable for the particular occupation.

An interesting example of the usefulness of the bloomer costume arose when the alien draft bill, under consideration, brought to light the fact that in New York alone there are several thousand window washers, all within the draft age and aliens. Women must take their places, and in so doing the bloomer costume will of necessity have to be adopted. Manufacturers, when considering the various problems brought before them because of our selective drafts, must not overlook the essential question of proper garments for women.

In our investigations among numerous industries in this country covering various kinds of work, we find that so far not much substitution has been necessary. Where it has been, men who have in the past been doing the light work have been transferred to fill positions vacated in heavier work while women replace them in the lighter grades of work. Women are, in most cases, physically unfit to perform continuously man's labor, and so it becomes necessary to adopt ways and means of assistance, such as an attendant nurse, rest rooms, etc. In fact many of our factories for some time past have given such matters serious consideration as a most direct and undisputed method of increasing production. Where ordinarily an employee feeling slightly indisposed or receiving a minor cut would be obliged to absent himself or herself from work for the day,

perhaps with such facilities as above described he or she can secure temporary relief and with the use of the rest room for a short while return to work.

Manufacturers inform us that the increase of production directly attributable to welfare work is difficult to measure but absolutely certain.

Plenty of fresh air, good light and opportunities for a short period of recreation, either during the lunch hour or at some other stated period, are without a doubt conducive to efficiency and capacity. As a means of ventilation some factories have installed a blower system whereby the stale air is drawn out of the rooms by one set of pipes and fresh air blown into them by another set. Natural lighting is preferable to artificial on grounds of health as well as economy.

It is impossible to lay down any hard and fast rules as to the number of hours women can work with advantage. Much depends upon the character of the occupation. It is not desirable for women to work at night, but if in the exigencies of war time it is deemed absolutely necessary, it should be on three shifts of eight hours each rather than two shifts of twelve hours each, for we must not forget that women who hitherto have been entirely unaccustomed to factory life are now or may become a part of it. It has been found that operatives, if left to themselves, took rests at irregular and often unsuitable times; hence in many instances, more particularly in England, at present, a ten-minute break in the middle of the forenoon and afternoon is made, and during the interval operatives remain at their ma-

chines, but take tea or other nutriment brought them by boys or traveling canteens. This has been found to be a valuable aid to output.

If war forces upon us more acute labor conditions, the installation of industrial canteens will become of great importance. Night labor and more general employment of women will undoubtedly create greater difficulties in securing adequate food for operatives. This statement is based upon the experience of our Allies. Productive output in quality, amount and speed is largely dependent upon the physical efficiency and health of the worker, which in turn is dependent upon nutrition. The employer who looks into this question will be convinced that, in the highest interest of both himself and worker, proper facilities for adequate feeding arrangements should be available in or near, and should form a part of, the equipment of all modern factories and workshops. The success of such a department depends most naturally upon its management. The employer may manage, may appoint a management committee, or the entire arrangement may be leased to a professional or voluntary caterer. In most of the successful canteens joint control is exercised by employer and employees. The most convenient method of payment is for the workers to buy books or series of tickets or checks.

In one of the most enterprising industrial plants in Boston, Mass., such a canteen is successfully operated, and reported by the employer to be of material benefit in increased output. Employees desiring to lunch there

are served in a neat and attractive room furnished with counters and the food is nourishing though plain. Everything is systematized so that the food is quickly served. After lunch employees are afforded ample time and opportunity for a walk around the park maintained by the company or on the roof garden, and return to their work in a fresh and invigorated condition.

In a bleachery, dye and print works in North Adams, Mass., we find work of a vastly interesting nature being successfully carried on. Of their employees, at present, approximately five per cent more are females to-day than a year ago, and from this substitution they have learned that in many occupations heretofore open only to men women are found to be quite satisfactory. The bloomer costume has been encouraged to the extent that the company supplied the first outfit without expense to the employees, and it has met with generally satisfactory results. In fact, it is their intention to greatly increase the use of these costumes, owing to a recent accident which was caused by a woman's skirt blowing into the gear of a machine. This costume is found to be almost a necessity in the rougher classes of work and where women are employed around machines.

In two cotton mills in the State of Connecticut much is being done in the way of welfare work among employees. Medical departments, exceptionally well equipped, are maintained. In connection with one plant, a day nursery is being successfully operated. Some three hundred odd women are employed by this company, which finds better results are obtained from

such workers who have brought their children to the nursery in the morning, knowing they will be well cared for during the day. This costs the employee the small sum of fifteen cents per day for each child, while they have been paying to individuals outside from two to three dollars a week for such care. Much assistance is being rendered to the employers by these nurses and welfare workers, who keep strict account of all the workers who are out, an investigation being made in each case and steps taken to remedy the causes of unnecessary absences. In a case where serious differences arose between two valuable employees, and one was about to leave, these were adjusted through the efforts of the welfare worker, without annoyance to the employer, and the services of a good man retained, plus the time which would possibly have been consumed in locating a successor.

It must be remembered that a manufacturer's equipment is of two kinds — human and mechanical. Industrial welfare workers state as an axiom that employers who treat their employees with as much consideration as they do their machinery have done much to solve the labor and production problems.

We now come to the question of the "Welfare Supervisor." Welfare supervision is simply the creation in a factory of those conditions which enable each individual worker to be and do his or her best. Great care must be taken in the selection of the supervisor. She should have a real love for girls and be methodical and of businesslike habits. The girls and women should feel

that she is their friend and sympathizer. This subject has been recently brought into prominence in England by the Minister of Munitions, who determined that welfare supervisors must be appointed in every national munition factory where women and young persons are employed. But we do not have to look entirely to England for such examples because many factories in our own country have resident nurses who fulfill to a great extent the duties of the English welfare supervisor. Various industries have been visited by the writer and in each instance the nurse was found to be, according to the employer, of invaluable assistance to him generally. A marked feeling of good fellowship, efficiency and contentment predominated and was plainly visible to the visitor. Many employers can show that they have been able to obtain a higher class of labor, both as to education and morale, because of the supervisor. The expense incurred by the appointment of this worker should be considered a legitimate expenditure for improving the efficiency of the staff. The duties fulfilled by these supervisors vary — namely, to engage workers, supervise the canteen, kitchen, cloak rooms and lavatories; to maintain discipline, organize generally, supervise first aid, and to give any advice of which they are capable when appealed to by any of the workers.

The employment of women should be properly safeguarded and wisely supervised; if not, the ultimate results may be far from desirable or beneficial.

REPLACEMENT OF MEN BY WOMEN IN INDUSTRY IN GREAT BRITAIN

THE increase in employment of women has been greatest in England's so-called "non-industrial" occupations, banking and finance leading with an increase of 242.7 per cent since the year 1914, transport coming next with 168.7 per cent. Among the strictly industrial occupations the group of metal industries shows the greatest increase, with the chemical group following. Owing to the extensive employment of female labor before the war in the textile industry, the rate of increase has naturally been small; but wherever it has been possible, female help (to a number in excess of 30,000) has been substituted for male, as will be seen in the following chapters.

The women workers of to-day are of many types including women and girls of every social grade and without previous wage-earning experience; wives and widows of soldiers and those who had married and retired altogether from industrial life. In the character of the response lies largely the secret of industrial success. The fact that women and girls of all types and ages have entered and are entering into industry shows a spirit of patriotism which is responsible for the economic standing of England to-day. Conditions of work

have been accepted by these patriotic women without question and without complaint.

In general, there are five points which apart from the question of wages, concern the health and industrial output of the worker, and which have demanded the careful attention of the employers in regard to the employment of women on a large scale, namely,

(1) The period of employment, including night work, length of hours, and overtime
(2) Rest pauses and provisions for meals
(3) Sanitary conditions of the factory
(4) Physical condition of women workers
(5) Questions of management and supervision

The imperative necessity of the war has revived, after almost a century of disuse, the night employment of women in factories. Prohibited for the textile trades by the factory legislation of 1844, it disappeared gradually in Great Britain, and also in other countries, until, after inquiry and deliberation, it was banished by international agreement from the twelve European countries which signed the convention drawn up at the international conference held at Berne in 1906. The agreement was based upon the results of inquiries into the effects, economic, physical and moral, of night work for women.

The reports showed deterioration in health caused by the difficulty of securing sufficient rest by day; disturbance of home life with its injurious effects upon the children; and diminished value of the work done, the common experience being that night work was inferior

to day work. Once more these facts are in evidence. In a working class home the difficulty in obtaining rest by day is great; quiet cannot be easily secured, and the mother of a family cannot sleep while the claims of children and home are pressing upon her; the younger unmarried women are tempted to take the daylight hours for amusement or shopping; and furthermore, sleep is often interrupted in order that the mid-day meal may be shared. Thus it has again been found that the employment of women at night is, without question, undesirable. Being necessary in some cases, efforts have been made to reduce its risks to a minimum.

There is a general opinion that women are unable to bear the strain of long hours, and there is some divergence of views as to the number of hours that can profitably be worked. The great majority of the employers have not asked to be allowed to have their female employees work more than 65 hours per week. Results have shown that the strain of long hours is serious, and that continuous work in excess of the normal legal limit of 60 hours per week ought to be discontinued as soon as it is practicable. In the case of married women arrangements have been made in textile towns to have the older and inexperienced women do the housework for those who have returned to the mills. The working hours have been divided into three shifts of eight hours each or two shifts of twelve hours. The tendency at present is to employ women workers on the eight-hour shifts only and men on the twelve-hour shifts.

Pauses for rest and food have been found to be of the highest value in averting breakdowns and giving impetus to the output. The Factory Acts permit in textile factories a maximum of four and a half hours continuous work and in non-textile the limit is five, but it has been found that four hours is the longest period during which a woman can maintain continuous work at full vigor. Within this period a pause of ten minutes has been found to give excellent results; and where the spell is continued for five hours, some such pause should certainly be made for a cup of tea or cocoa. It is particularly valuable in the morning spell in those numerous cases where breakfast has been hurried or omitted altogether, especially where the work is laborious and creates an intense feeling of hunger.

Facilities have been provided, especially during the night shift, for rest in case of fainting or other temporary illness. These are found in all well-equipped works and they usually consist of a few comfortable chairs and a camp bed for the more serious cases. A nurse is generally in attendance, whose assistance is claimed by men and women alike.

The week-end rest has also been found to be a factor of such importance in maintaining health and vigor that it has been reinstated by employers who had taken it for work at the beginning of the war. The general opinion is that for women and girls a portion of Saturday and the whole of Sunday should be available for rest, and that the periodic factory holidays, common in England, should not on any account be omitted.

When women are employed on eight-hour shifts, an interval of half an hour for a meal has been regarded as normally sufficient; but where longer hours are worked, it was found important that they should be allowed an hour for dinner and for the principal meal during the night. Indigestion cannot easily be avoided if a substantial meal is followed by work without an intervening period for rest.

Attention has also been given to providing good, wholesome and tempting hot meals, and by a small expenditure rest rooms were arranged and the meals eaten under restful and quiet conditions.

The effect upon the health and energy of women and girls which results from clean, bright and airy workrooms, well warmed in winter, can hardly be exaggerated. Women desire these things in their working hours and appreciate and respond to a good environment. Cleanliness and good order have been found to contribute to increased output as well as to the discipline and morale of the factory, and provision for washing accommodations has become increasingly important. The refreshing effect of washing and its influence on self-respect, especially where the employees are heated by their work, has a tendency to increase production.

Cloakrooms have been provided, and wherever possible have been located near the rest rooms. In addition, facilities for changing clothes and boots, for drying wet outdoor clothes in bad weather, and working overalls used in wet processes, have been found valu-

able. To dry the clothes steam pipes have been placed under the hanging pegs.

It is obvious that many of the women entering upon employment in the factory system were unaccustomed to its conditions. In considering the physical capacity of such women successfully to withstand the fatigue consequent upon continued work of this kind it has been remembered that her body is physiologically different from, and less strongly built than, that of a man; that her muscular system is less developed; and that she may have lived a sedentary or domestic life and is not in the habit of taking active and regular exercise. The nature of her work has, therefore, been determined with due regard to its effects on her immediate and future health. The lifting and carrying of heavy weights and all sudden, violent or physically unsuitable movements in the operating of machines have been avoided. In many cases a simple appliance, or the alteration of a movement, modifies an objectionable feature when it does not altogether remove it. By similar thought and care much has been done to mitigate the injurious strain of prolonged standing.

The modern development of commercial undertakings, as also the vast size of many factories, precludes the personal oversight and interest of the responsible employer, and makes it all the more necessary to appoint efficient subordinates. This is particularly important with regard to the occupation of women unaccustomed to the organized factory life, business methods and discipline of large textile plants. In all cases

where women are employed, consideration has been given by the management to the appointment of forewomen, nurses and welfare supervisors, whose positions and status have been properly assured and whose duties are prescribed. In this way provision has been made for each woman worker to have ready access to an officer of her own sex in case of difficulties occurring in regard to her work, her health, or the conditions of her employment.

The following sub-chapters give a brief outline of the operations in the industries in Great Britain where women have replaced men and have taken upon themselves the economic and industrial welfare of their country.

THE WOOL INDUSTRY

THE substitution of women's labor for men's in the wool industry during the war was arranged at a series of conferences between representatives of the employers and the Government. The final result was an agreement as to the processes in which the substitution was possible and the following is a list of the operations in which it was decided that female labor could be substituted for male.

A. Woolen Spinning and Weaving.
   1. Carding and condensing machine tending.
   2. Mule spinning.

3. Warping.
4. Twisting in.
5. Weaving.

B. Worsted Spinning and Weaving.

1. Wool sorting.
2. Carding machine tending.
3. Gilling machine tending.
4. Combing machine tending.
5. Back-washing machine tending.
6. Warping.
7. Twisting in, except in the loom.
8. Weaving.
9. Perching, if men lift the pieces.

Since the above agreement was signed, further attempts to introduce female labor have been successful. In the woolen section, women are operating rag grinding machines and assisting in the willeying process. In the worsted section women are now acting, after training, as second hands in the spinning department, in the finishing room, and crop and pack the cloth when male labor is not available.

THE COTTON INDUSTRY

THE preponderance of female employment before the war in most of the cotton manufacturing departments restricted the possibilities of substitution, but much has been done by reorganization and by the introduction of female labor into processes hitherto reserved for men, thus filling the gaps caused by enlist-

ment for military service. The following summary, based on information recently collected, indicates practical measures of reorganization that have already been adopted in individual mills.

A. Opening Room. Women are being employed in mixing, opening, spreading, and as assistants at scutchers or waste breakers. Where runways are provided, or the laps are not too large and heavy, women are employed as lap carriers.

B. Card Room. (1) Some rearrangement of the work of strippers and grinders has allowed the individual workers to attend to more machines, while the subsidiary work such as oiling and cleaning is done by women and young persons suitably clothed. (2) Women are also employed as tenders to Derby doublers or condensers.

C. Ring Spinning. Work of putting on bands and doffing is now being done by women.

D. Mule Spinning. The shortage of labor has been made good by

(*a*) an extension of the system of "joines minding" and

(*b*) employment of women and girls as big and little piecers, also as creelers and to fill tube boxes.

E. Twisting. In most cases women are tending the twisting frames except in night work, which is being done by men.

F. Weaving. A higher proportion of women weavers are employed. In some classes of weaving young weavers are promoted at an earlier age,

and an increased number of looms are assigned to individual weavers in suitable cases.

G. Subsidiary Weaving Processes. Reorganization has been effected by temporarily withdrawing male workers from the weaving shed to act as overseers or to assist the tape-sizers. Women are suitable to be employed in beaming, and ball warping for light warps under 30 pounds if balling machines are employed, also as drawers and twisters.

H. Finishing Department. In the finishing room, packing in cases, knotting and pressing and making up bundles is generally performed by women, also, cloth inspecting, cutting and straightening, cutting patterns, attending plaiting and creasing machines, marking off and ticketing, light hooking and stamping, papering, parceling, or making up a variety of light goods from the weave room.

Some slight period elapsed before full efficiency was attained, more particularly in the ring room, on the mules and in some of the subsidiary weaving processes, but the necessary skill and training was readily acquired by the intelligent worker.

Note:—In our textile library we have a very interesting and valuable report on "The Substitution of Female for Male Labor," which was prepared for us by the American Consuls at Bradford and Manchester, England, under date of September 27th, 1917. This report, which we have just received from Hon. Robert P. Skinner, American Consul-General at London, explains more particularly the dilution of textile labor in cotton and wool spinning, the clothing trade, and gives very valuable labor and wage statistics affecting the textile industry in Great Britain. This report is available for the confidential use of textile manufacturers.

PRINTING, BLEACHING AND DYEING

THIS branch of the textile industry covers many different classes of work. The employment of women in these operations depends not only upon the weight of the goods to be handled, but also whether the plants are modern or old-fashioned. The most successful substitution has taken place in (1) the bleaching and dyeing of velvet and cords, and (2) the bleaching of cotton wool and waste. With regard to the velvet and cord dyers, the weight of the pieces has been a help in enabling women to be employed. On the dye jigs, alterations have been made so that the rolls can be lowered onto trucks instead of being lifted out of the sockets. The work generally has been redistributed so that women are employed under the direction of expert men, and where necessary, assistance is given for moving weights which would be too heavy for them. The following is a list, compiled after careful inquiry, of the processes in which women are being employed and have proven satisfactory substitutes for men. (Where women are employed only as Assistants the name of the process is followed by the letter A; P, for Partial, indicates that there has been subdivision or rearrangement of the process to facilitate substitution. In other cases complete substitution has been effected.)

1. Printing, Bleaching and Dyeing Piece-Goods other than Velvets and Cords.

Grey Room.

Stamping. P.
Unloading. P.

Singeing.

Gas or Flame Singeing. A.
Plate singeing. A.

Mangling and Starching.

Machine Scutcher tenders (backfill, scotch, second time, dod, dutch, dye, first time, friction, padding, starch, stiffening, stone mangles).
Scutcher hands work. A.
Starch mixing. P.

Drying, Beetling, Calendering.

Beetling stitcher's work. A.
Calender tender (chasing, embossing, friction, schreiner and swiss calenders). A.
Cylinder drying (taking off or plaiting down). A. Replacing boys.
Pasting (hand).
Drying tin tenders (taking off or plaiting down). A. Replacing boys.
Sewing or stitching (white room). Work always done by women in some places.
Tenter machine tenders. Work always done by women in some places.
Stretching machine (belt or strap and clip machines). A. Under supervision of experienced men.

Dyeing and Mercerizing.

Jig dyeing. P. A.

Mercerizing machine tender. P. A.
Sewing or Stitching (dye department).

Printing.

Aerographing (hand printing).
Block Printing. A.
Larrying (laboring). P. Lighter trucks required.
Machine printers' assistants' work (bank tending). P. A. Replacing boys.

Raising and Finishing.

Raising machine tending (short pile and Moser machines). Under skilled supervision.

Finishing Room.

Doubling or creasing (machine).
Doubling or creasing (hand).
Lapping (rolling) machine tending.
Making up (bolt finding). Flannelette trade. P.
Marking off.
Measuring. Replacing boys.
Packers' clerks' work.
Packing, hydraulic press tender. P. A.
Parcelling. P. A. Replacing boys.
Paring.
Pattern cutting.
Plaiting machine tending. P. Replacing boys.
Pressing. A.
Stamping. P. A.
Taping. P. A.

2. Bleaching and Dyeing Velvets and Cords.

Ashpan tending (bleaching). A. Replacing boys.
Backing (moles) or cropping. A. Replacing boys.
Checking (clerical work).

Chemicing. A.
Hand work (mender room).
Drying cylinder tending (taking off). A.
Dye jig. P. A. Appliances for lifting rolls in and out of jigs.
Drying tins or cylinders. P.
Finishing machine tending.
Finishing Moles. A.
Gassing or Singeing.
Brushing Machines.
Grey Treadles. Tenders.
Loading. P. A.
Mangle tending. A. Replacing youths.
Passing Table tending. Marking off. A.
Peg (or Lustering) Machine tending. Carrying, tending and pulling over. Replacing boys.
Plaiting Machine tenders. Replacing boys.
Setting Up (Hand Finishing). Replacing boys.
Shearing or Cropping Machine tending.
Singeing (Plates).
Sour Tank Tending (Bleaching). P. A. Replacing boys.
Stamping (Hand). A. Replacing boys.
Tail Ending. Suitable only if adequate means for ventilation and for the removal of dust are provided.
Washing Machine tending (Bleaching). P. A. Replacing boys.
Waxing Machine tending or Brushing. Replacing boys.
Wince Winding (Bleaching). P. A. Replacing boys.
Wiring In. Replacing boys.

3. Yarn Bleaching and Dyeing — Hanks and Warps.

Balling. P. Men required to take off and lift heavy warps.

Box Winding, Dyeing, and Sizing Machine. Replacing boys.

Cylinder Drying Machine tenders. A. Replacing boys.

Dyeing Machine tenders. Storing (Tins). A. Replacing boys.

Hydro-extractor tenders. P. For the lighter work.

Making Up (Heading, Parcelling, Papering, and Ticketing). P.

Splitting — Hand and Machine (Warps). Suitable for women of strong physique only.

4. Cotton (Raw) and Cotton Waste Bleaching and Dyeing.

Bagging. P. Men assist with heavy weights.

Bleaching Kier tenders. P. A. Filling Kiers only. Special protective clothing (trouser suits) required.

Breaking Machine Feeding.

Drying Machine tenders.

Hydro-extractor tenders. P. For the lighter work. Lighter forks are provided for emptying. Special protective clothing and footwear worn.

Washing Machine tenders. As above for Hydro-extractor tending.

5. Cop Dyeing and Bleaching.

Drying. P.

Hydro-extractor tenders. P. For the lighter work.

Packing for Delivery. P. Men assist with heavy weights.
Packing for Dyers. P.

Women can be profitably employed in the chemical storehouse and shipping departments.

HOSIERY AND KNITTING

IN the knitting departments the practice as to the class of workers on the same type of machine varies in different parts of the country. In Scotland, women are customarily employed in charge of almost every kind of knitting machine and they work exactly under the same conditions as men, even on the largest Cottons' Patents' knitting machines. In England, few women have been employed in the past on these or other large machines. There are a few cases where the Scotch practice has been followed, but in the great majority of mills, women have been restricted to the lighter knitting machines.

Substitution of women has taken place during the present emergency, in many cases, on various types of circular and flat machines formerly worked by enlisted men, and, in some instances, women are being employed as assistants to men on the larger machines. In one large factory, where each Cottons' Patents' machine was formerly operated by one man, each skilled man can now attend two machines with the help of a

woman assistant. Other machines on which substitution has been noted are Dubrect's, Harrison's and other flat machines, Jersey and other heads, X. L., Pearl and Scott-Williams' machines.

In the making-up departments women are now being employed in place of men as overseers.

In the shipping departments women are being largely introduced into men's processes of folding and other work at the counters, and in packing.

In the finishing department women are being employed in trimming, boarding, and pressing work. Women have also been introduced as assistants at large raising machines.

In most of the operations a period of training has been found necessary before the new workers become of service. In some cases where training during the day would interfere with the output, women were trained during the evening, after working hours.

HEAVY CLOTHING MANUFACTURE

BEFORE the war women already constituted the majority of those employed in heavy clothing trade, and most of the processes were women's. The important departments, however, of cutting, trimming, and fitting up were carried on, in the main, by male operatives only. The increasing shortage of male labor, due to enlistment of the younger men, has now

made necessary some temporary reorganization of these departments for the duration of the war. Careful inquiry in all the chief centres of the clothing trade as to the possibilities of substitution has shown that women can be employed in:

1. Cutting.
2. Trimming.
3. Fitting up.

The terms "cutting," "trimming," and "fitting up" are used to cover the following processes:

(*a*) Marking in or marking up.
(*b*) Laying up or folding cloth or linings or other material.
(*c*) Cutting (except with the band knife).
(*d*) Dividing.
(*e*) Fitting up,

and any other processes usually connected with these branches of the trade.

Training. — As in all the processes enumerated, women, at the outset, have been employed as assistants under the supervision of skilled men, and gradually trained to the performance of the more difficult operations while rendering useful service in those which are subsidiary and comparatively simple.

LIGHT CLOTHING MANUFACTURE

FOR the purpose of this chapter, the light clothing trade may be conveniently divided into three branches:

A. Shirts and Underclothing.
B. Collars.
C. Corsets.

Of these, the last is the most important from the point of view of substitution.

The number of male operatives employed before the war in each of the three branches was small, most of the processes being women's processes and the men's work confined mainly to the cutting room. In certain factories, it was for some time found possible to carry on this department by means of men ineligible for military service; in others, temporary reorganization for the duration of the war became necessary in 1915. With the constantly increasing shortage of male labor, a more general replacement of men by women was needed if the trade was to continue active. Inquiry has shown that women are being employed successfully in the following processes. (Where women are employed only as Assistants, the name of the process is followed by the letter A; P (for Partial) indicates that there has been subdivision or rearrangement of the process to facilitate substitution. In other cases complete sub-

stitution has been effected.) Processes not included in the list are those in which inquiry has not at present discovered cases of successful substitution:

A. Shirts and Underclothing (including manufacture of dressing gowns, pajamas, blouses, pinafores, children's washing suits and frocks, etc.):
   1. Cutting by band knife. Careful selection and gradual training required.
   2. Cutting by guillotine. Careful selection and gradual training required.
   3. Cutting by hand.
   4. Cutting by electric shears.
   5. Cutting by slot knife.
   6. Hanging. Women replace boys.
   7. Laying out. Women replace boys.
   8. Laying up.
   9. Penciling and preparing. P. A.

B. Collars:
   1. Cutting by hand (rare). Considerable training required.
   2. Folding. Women replace boys.
   3. Hooking up. Women replace boys.
   4. Pattern making.

C. Corsets:
   1. Cutting by band knife. Thinner lays and reduction of hours during training period necessary.
   2. Cutting by guillotine. Thinner lays and reduction of hours during training period necessary.
   3. Cutting by hack knife.
   4. Cutting by shears. Thinner lays necessary.

5. Fitting (hand).
6. Laying out. Women replace boys.
7. Making up (sorting and tying). Women replace boys.
8. Marking in.
9. Pickling and plating (busks). P. A.
10. Platemaking.
11. Pressing (hand).
12. Pressing (machine). Introduction of lighter irons and machines run by electricity instead of steam.
13. Reducing (trimming off).

Operations common to all three Sections of the Trade:

1. Checking.
2. Dispatching.
3. Loading up. P. Women handle small and moderate sized parcels.
4. Packing parcels. P. Some sectionalizing of work necessary.
5. Parcelling.
6. Printing rooms:
   (*a*) Setting up type. Training necessary.
   (*b*) Working machine.
7. Stock-keeping. In some factories men carry the stock to and from the higher shelves.
8. Storekeeping.
9. Ticketing.
10. Wash-house processes. P. A. Women assist at hydros, starchers, etc.; men lift heavy weights and attend washing machines.

Training. — In certain of the processes named, training, varying from two to six months, was required before the worker could be considered expert, but in

many the services of women could be utilized after a short period of instruction. Several manufacturers, in view of the probable calling-up of men hitherto exempted, began, eighteen months ago, to train some of the women in their employment on the guillotine, band knife, hand collar-cutting, etc., with the view of providing against any sudden disorganization of their trade.

LEATHER TANNING AND CURRYING

PREVIOUS to the war this trade was carried on by male labor, but experience shows that in many departments the work can be done by women. The trade may be divided into three classes:

(1) Tanning of heavy leather.
(2) Tanning and currying of light leather.
(3) Chrome tanning.

These classes differ as to the work on which women can be employed, and to some extent require different types of women workers. Work at the lime and tan pits with the offal, (i.e., bellies, heads, and shoulders) in the heavy leather tanneries, requires women of strong physique, and it is both wet and dirty, necessitating special clothing to protect them (i.e., leggings and mackintosh aprons). Work on the softening machines, in the light leather trade (sheep skins, etc.), calls for no special strength and is both dry and clean.

Women are employed in:

A. Heavy Leather Trade:

All the processes in the tanning of offal parts as well as the following:

(1) *Scraping off hair which the machines have failed to remove.

(2) *Handling offal and light-weight leather at the lime pits.

(3) Tending the liquor pumps at the tan pits.

(4) Handling light-weight leather at the pits — known locally as "handling at hangers or rockers."

(5) In the drying sheds: Carrying off from machines, oiling, washing and hanging of all offal parts and assisting to oil the bends (i.e., the heavier pieces, backs, etc.); the men do the heavy lifting and the women help them.

(6) Tending to polishing, splitting, and setting machines working offal parts.

(7) Assisting at setting, pinner, and scouring machines.

B. Light Leather Trade:

(1) Tending the following machines:

(*a*) Sizing (brushing on). Finishing.

(*b*) Staking (softening machines).

(*c*) Buffing and brushing-off machines — known in some places as "wheeling."

* Wet work and dirty work, which requires the provision of special clothing (leggings and mackintosh aprons) so as to keep the workers' clothes dry.

(*d*) Rolling, glazing, embossing and printing.

(2) Washing, oiling, and staining leather (hand work).

(3) Straining (stretching on to racks). Hand work.

(4) Hanging leather in drying sheds or stoves.

(5) Oiling and seasoning (hand work) or finishing.

(6) Ironing (hand work).

In tanning leathers for glacé kid:

(7) *Emptying barrels (goat skins).

(8) Opening out and piling on horses the skins taken from the tumblers or drums.

(9) *Emptying the tumblers.

In tanning leather for gloves:

(10) Washing and scouring.

(11) Tending vats and paddles (tanning process).

C. Chrome Tanning:

(1) Serial striking-out machines (back and front) or setting machines.

(2) Single striking-out machines (back only).

(3) Tanhouse laboring:

(*a*) Currying.

(*b*) Dipping in hypo and acid liquors. 2 bath process — kid and sheep.

(*c*) Horsing up in tanhouse.

(*d*) Blue striking out.

(4) Currying and Fat Liquoring Department Dye House:

* Wet work and dirty work, which requires the provision of special clothing (leggings and mackintosh aprons) so as to keep the workers' clothes dry.

(*a*) Helping in laboring except on shaving machines.
(*b*) Stoves. Drying.

(5) Fluffing and buffing machines.

(6) Finishing tables:
(*a*) Seasoning.
(*b*) Stuffing.
(*c*) Coloring (but not on graining or glacé).

(7) Glazing machines (slow action only).

D. In all Classes of Work:

(1) Hair sorting and drying.

(2) Warehouse work:
Sorting lighter pieces of leather.
Assisting to select leather.
Assisting packers.
Carrying off from sorters and storing in racks.
Tending measuring machines.

(3) Cleaning up and general laborer's work — both in the yards and the factory.

(4) Clerical work — taking weights of hides and leather and acting as timekeeper.

BOOT AND SHOE MANUFACTURE

MANUFACTURERS have found it possible to employ female labor successfully on an increased range of processes during the war period, and these extensions have affected all branches of the trade,

whether heavy or light. There is, however, even among firms engaged in the same class of work, no uniformity of practice as to the actual operations carried on by women.

The following is a list of the chief processes in which women can be substituted and which are already being performed by women in place of men in various factories. (A few of these instances do not apply to the heaviest class of work, such as the manufacture of army boots.)

CLICKING DEPARTMENT:

Upper stock-keeping.
Hand Clicking.
Operating Clicking Presses.
Sorting.
Splitting.
Marking.
Operating measuring machines.
Pattern cutting.

ROUGH STUFF DEPARTMENT:

Rough stock-keeping.
Operating cutting presses.
Splitting.
Operating rolling machines.
Sorting.

PREPARATION DEPARTMENT:

Operating Nichols' evener and grader machines.
Moulding stiffeners.
Rounding on Julian or Planet machines.
Operating Summit sole evener.
Moulding soles.
Skiving.

Outsole channeling.
Insole channeling.
Piecesole beveling.
Feather-edge shank reducing.
Operating Gem canvas machines.
Cementing.
Size stamping.
Fitting-up.

HEEL MAKING DEPARTMENT:
Heel building.
Rand tacking.
Heel compressing.
Tip nailing.

MAKING DEPARTMENT:
Assembling.
Upper trimming (Goodyear).
Welt beating.
Waste skiving.
Sole laying.
Rough rounding.
Channel opening.
Staple tacking.
Operating piecesole attaching machines.
Channel closing.
Heel attaching by machine.
Loose billing.
Operating Universal slugging machines.
Operating breasting machines.

FINISHING DEPARTMENT:
Assisting bench men (knifing-up and taking-off).
Heel scouring.
Inking.
Backing.
Bottom buffing or scouring.
Stitch separating.

The employment of women in this Department is at present rare:

SHOE ROOM:

Those operations in this Department which were not already performed by women before the war have now been undertaken by them.

NOTE: — In the case of children's boots and shoes, all processes of manufacture are now being carried out by means of female labor.

LEATHER TRADE: CASE AND FANCY LEATHER

THE department of the leather trade known as case work is mainly in the hands of men who have acquired an expert knowledge of the trade. Women have, however, been used to a considerable extent in the processes shown below.

The fancy leather trade is already to a large extent in the hands of women who do the preparing, machining and finishing. Some substitution has been found possible in the process of cutting.

The following is a list of processes suitable for women and, with two exceptions, they are already being successfully carried out by women:

A. LIGHT CASE WORK (including attaché cases, collar boxes, vacuum flask cases, etc.):

1. Cutting by press.

2. *Cutting by hand.
3. Preparing processes:
   Veining.
   Marking for stitching.
   *Grooving.
   Gluing leather to stiffening board.
4. Stitching.
5. Finishing processes:
   Rubbing up.
   Gluing in lining.

B. Cycle Saddles:

1. Machining.
2. Finishing processes.

C. Fancy Leather:

1. Cutting by press.
2. Cutting by hand.
3. Preparing.
4. Machining.
5. Finishing.

Training. — For most of these processes some training is required. The further introduction of cutting (or clicking) presses, however, would greatly facilitate the employment of women. It has been found possible, for example, by the adoption of "marking" processes (done by a skilled man) to employ unskilled women on presses in the cutting of complicated patterns out of expensive leathers.

* No instance has so far come to notice in which women are employed on these processes, but it is considered that women could successfully be employed on them.

THE GLOVE INDUSTRY

THE initial processes of preparing the tanned skins and cutting-out, the finishing process known as laying-out and the cutting of fabric gloves have been, in the past, almost entirely restricted to men by trade customs of long standing. Much of this work is highly skilled, but women have been successfully introduced to replace men in the following processes, in a few plants, and there appear to be opportunities for further replacement:

1. Wheeling, buffing, and padding skins.
2. Cutting-out chamois and other light leathers, and assisting skilled cutters in preparing thumb and finger parts, and in pulling down.
3. Cutting of furs and gauntlet parts.
4. Punching or webbing.
5. Laying out or ironing.

Women also assist in cutting out fabric gloves.

A conference between the Trade Unions and the Employers' Association of the trade was held and an agreement was signed stating:

1. That the suspension shall have effect only during the continuance of the war.
2. That women shall only be employed in substitution

for men where and so long as it is not found possible to obtain male operatives.

3. That the women introduced shall be paid the same wage rates as men for equivalent work.

SOAP AND CANDLE TRADES

IN the initial processes of soap and candle making it has not been found practicable to employ women to any great extent owing to the heavy nature of the work; but much of the lighter work, formerly carried on by men and youths, is now being successfully done by women. The following is a list of processes in which it has been found that women's labor can be utilized:

SOAP:

(1) In the Melting Department:
  (*a*) Rolling full and empty barrels.
  (*b*) Scraping resin off barrel staves.
(2) In the Soap Boiling Department:
  (*a*) Regulating fall pipe.
  (*b*) Carrying fob.
(3) Tending crutching machines.
(4) Carrying and emptying cases in melting house (transparent toilet soap).
(5) Bar moulding (household soap).
(6) Cutting slabs into bars; cutting bars into short pieces; taking off at cutter and piling.
(7) Shredding and drying (toilet soap).
(8) Tending mixing machine (toilet soap).

(9) Milling (toilet soap).
(10) Plodding (toilet soap).
(11) Hand stamping.
(12) Machine stamping (with or without power).
(13) Trimming (toilet soap).
(14) Trucking.
(15) Can filling.
    (*a*) with liquid soap.
    (*b*) with soft soap.
(16) Wrapping and packing (light work).
(17) Loading vans (light work).
(18) Filling drums with glycerine from large vats.

CANDLES:

(1) Scraping and packing of block paraffin wax (light blocks).
(2) Winding, doubling, plaiting and leaching wicks.
(3) Candle making — filling, winding up and emptying in moulding department. In some factories with the present equipment the work would be too laborious for women, and substitution of women would necessitate some reorganization of the work.
(4) Casting dips.
(5) Stamping name on candles.
(6) Wrapping small bundles.
(7) Packing small boxes.
(8) Making night-light cases.
(9) Putting wicks in night-lights.

BOX MAKING: Nailing boxes and stenciling.

Training. — In some of the above processes, time and practice are necessary in order to attain the req-

uisite speed. In the making and dipping of candles, a certain amount of skill is needed, but this can be acquired in a moderately short time.

PAPER MAKING

IN view of the wide variations in the machinery and general conditions in the different paper mills, it is not suggested that the processes named can always be assigned to women, but, while the circumstances of each factory must be considered, it is certain that many British manufacturers have failed to grasp fully the assistance which women can render. In some works very few attempts have so far been made to introduce women in place of men, whereas in other works, the substitution has already been carried very far.

A. Preparatory Process:
   (1) Stowing bales of esparto or wood pulp.
   (2) Trucking bales of wood pulp (up to 4 cwt.).
   (3) Opening bales of chemical and mechanical pulp.
   (4) Working hand crane to load carts and trucks.

B. Manufacturing Process:
   (1) Feeding mechanical pulp into willowing machines.
   (2) Feeding esparto into willowing machines and boilers.
   (3) Trucking from esparto boilers.

(4) Feeding mechanical and chemical pulp into potchers and beaters.
(5) Feeding rags and paper chippings into pulping machines.
(6) Feeding edge runners or "rollergang" machines.
(7) Assisting at coating machines.
(8) Assisting at calenders.

C. Finishing and Warehouse Process:

(1) Assisting at some kinds of reeling machines.
(2) Filling cutting machines (with aid of lifting tackle).
(3) Assisting to pack webs of paper (up to 1650 lbs. weight) and transporting these on trucks.
(4) Tying and bundling into reams and half reams (generally up to about 40 lbs. weight, but in one case a weight of 130 lbs. was being dealt with).
(5) Trucking and general warehouse work.
(6) Sewing up bales for export.
(7) Loading vans and railway trucks.

GLASS BOTTLE AND FLINT GLASS TRADES

THE following is a list of processes in which women are working successfully in various parts of England in the glassware industry.

A. Mixing Department. Glass Bottles and Flint Glass.

1. Riddling sand and other yard work.
2. Picking over and washing cullet.

B. Glass House:

1. Glass Bottle Works.
   (*a*) Carrying from the blower to the lehr in suitable glass houses (adult women only).
   (*b*) Filling the lehr or oven in suitable glass houses (adult women only).
   (*c*) Taking off the bottles from the lehr. (This may only be done by adult women unless the lehr end is situated right away from the glass house.)
2. Flint Glass Works:
   Taking off the articles from the lehr.

C. Warehouse:

1. Glass Bottle Works.
   (*a*) Sorting.
   (*b*) Washing.
   (*c*) Packing in sacks or crates.
   (*d*) Stopper grinding.
2. Flint Glass.
   (*a*) Mould cleaning.
   (*b*) Cleaning and wrapping and packing of all glass articles.

It was found necessary to select steady adult women for work in the glass house as girls under 18 could not legally be employed. Arrangements were made for carrying the trays from the lehr end to the feed by

men or by means of moving tackle. Women required a little training to sort the bottles as they came from the lehr, and have been found to do it most proficiently.

WOOD WORKING TRADES

SAW and planing mills were found to be the least susceptible to the use of female labor. Upon investigation it was found that women and girls could be employed in light work in the following processes:

Small circular saw feeding;
Taking-off or drawing from circular saws;
Feeding and taking-off from planing and moulding machines;
Boring, mortising, dovetailing, and tenoning machine work;
Straight work on the vertical spindle;
Light carrying and trucking.

In box and packing case manufacture there was found considerable scope for the employment of women. In addition to the saw mill processes mentioned above, women have been successfully employed on jointing short lengths of wood for boxes and light packing cases, matching, tonguing and grooving, handholing, boring, recessing, nailing, screwing, wire stitching, corner hinging, sand-papering, buffing and finishing, printing and branding. Certain kinds of ammunition box work are well within their powers, including drilling, screw-

ing, nailing, jointing-up bottoms, and knotting and splicing handles.

In large furniture factories, with a variety of special machine tools, there is scope for the employment of women in light repetition machine work on the lines indicated above. In the cheap cabinet trade the cramping, doweling, gluing, and cleaning-up of small articles is being done. Fret work, carving by hand and by machine, inlaying, sand-papering, painting, staining and french-polishing are all done by women at one place or another. Upholstery, cover making, sewing, cording, and finishing have always been woman's work, and these occupations have been extended in such directions as filling, drawing, and buttoning cushions and mattresses, fixing webs and springs, and seating throughout pin-stuffed chairs.

General. — Light repetition wood turning is being done by women, such as bobbins, brush and tool handles, and certain kinds of chair legs. Picture and photo frames, fire-wood cutting and bundling, and a large range of light unskilled woodworking occupations of a repetition character all afford opportunities for the employment of female labor.

Training. — In a few of the processes enumerated above women could not be utilized without some training, but in the greater number only a short period would be necessary. Tools and cutters would usually have to be ground and set up by skilled machinists, and in most factories these and other men over military age would be available as teachers.

POTTERY (COARSE WARE) AND BRICK TRADE

AS the various branches of the Pottery Industry, which are grouped together under the general heading of "Coarse Ware," differ widely in the character of their products and their processes of manufacture, each branch is here considered separately in relation to the substitution of women for enlisted men.

The difficulty of employing women on heavy work was overcome in many plants by mechanical means. Excellent examples of labor-saving appliances have been noted in a number of factories; particularly in brick works where trolleys, precisely adjusted in height to the level at which bricks are taken off the press, have been installed.

The following is a list of processes in the various branches in which women have been substituted for men. It has been compiled after prolonged expert inquiry in the chief coarse ware and brick-making centres of England, Wales and Scotland.* Processes not included in the list are those in which inquiry has not at present discovered cases of successful substitution.

* Where women are employed only as assistants the name of the process is followed by the letter A; P (for Partial) indicates that there has been a subdivision or rearrangement of the process to facilitate substitution. In other cases complete substitution has been effected.

Class A. — Stone Ware.

(Bottles, Jars, and Similar Small Articles; Light Chemical Once-Fired Stone Ware.)

Making Shop Processes.

Finishing (fettling). Finishing by women, common in case of jam jars and other small articles before the War, has now been extended to articles of larger size.

Jolleying (making). Up to moderate size. Introduction of labor-saving means of transport in one or two cases.

Throwing. Small sizes only.

Turning. Up to moderate size.

Ware carrying. Up to moderate size and weight.

Kiln Processes.

Dipping (glazing). Up to moderate size.

Warehouse Processes.

Sorting and stacking up. Women replace boy for handling small and moderate sizes.

Testing (trying). P. Under skilled supervision.

Miscellaneous.

Packing. P. Sectionalizing of work is necessary.

Suitable arrangements must be made for lifting.

Class B. — Red and Buff Ware.

(*a*) Unglazed, including Roofing Tiles, Chimney Pots, Floor Quarries, Malt Tiles, Land Drains, Flower Pots.

Making Shop Processes.

Carrying ware, including taking off from presses and from land drain pipe ma-

chines. P. Only for the smaller sizes and lighter work.

Fettling (finishing). Mainly in floor quarry section.

Pressing, hand (moulding).

Press working. Where small or moderate sized tiles are made.

Throwing (flower pots). Smaller sizes.

Kiln Processes.

Setting on. Lighter pieces; or as assistants to men.

Wheeling to kiln. P.

Warehouse Processes.

Sorting and stacking up. P. Women deal only with small sizes.

(*b*) GLAZED — AGRICULTURAL AND DOMESTIC.

Preliminary Processes.

Clay carrying and wheeling. P. Loads have been reduced.

Preparing the clay. P. Subdivision of work.

Finishing (fettling).

Handle (ear) making.

Handling.

Taking off from thrower. Women replace boy.

Wheel turning for thrower. Women replace boy.

Kiln Processes.

Drawing (emptying). P. A. Usually part-time employment only.

Glazing (leading, dipping, painting).

Setting in (placing). P. Up to moderate weight only.

Slipping.

Warehouse Processes.

Picking over and stopping.

Sorting and stacking up. P. Women deal with the smaller size.

CLASS C. — FIRECLAY GOODS.

(*a*) SANITARY WARE, BATHS, SINKS, LAVATORIES, ETC., AND LARGE CHEMICAL WARE.

Making up Shop.

Fettling (finishing). P. Subdivision of work; men lift the articles fettled by the women.

Making (moulding). P. Subdivision of work; men lift the articles made by the women.

Shipping (bodying). P. Subdivision of work. Men lift.

Kiln Processes.

Glazing (enameling, painting). P. Subdivision of work; men lift.

Miscellaneous.

Wrapping (strawing). P. Small sizes wrapped by women; men lift.

(*b*) SANITARY PIPES AND SEWER FITTINGS.

Making up Processes.

Carrying off. P. Subdivision of work. Women carry off smaller pipes.

Fettling (finishing, spindle-working, turning, screwing).

Women fettle the smaller sizes.

Kiln Processes.

Carrying to Kiln. P. Smaller sizes.

(*c*) FURNACE BLOCKS AND LININGS. FIREBRICKS.

Making up Processes.

Dressing (finishing).

Laying out hand-made furnace slabs and tiles.
Making (hand).
Making (machine).
Moulding.
Stacking.
Taking off presses and loading on bogies.
Bogie running. P. Use of lighter bogies or increase in number of runners employed.
Drawing (emptying). P. A. Women employed outside kilns to assist men inside.
Setting.
Stacking. Special "steps" provided.
Wheeling to kiln. Women replace boys.

Warehouse Processes.

Sorting.

Miscellaneous.

Cleaning Floors.
Loading (piling in trucks).

(*d*) Crucibles.

Making up Shop.
Finishing.
Making.
Stacking.
P. Labor saving devices and sectionalizing of work. Women of strong physique required. All other processes as Class C (*c*) above.

Class D. — Bricks.

Preliminary Processes.

Clay carrying. Done in some districts by women before the War.
Clay grinding. P. A. Subdivision of work.
Clay mixing. P.

Filling Clay into Wagons.

Wheeling Clay. Lighter barrows provided and loads reduced.

Making up Processes.

Dressing (finishing).

Moulding.

Pressing (machine).

Taking off from presses and loading on bogies.

In some works a special trolley system facilitates press work and taking off. Mechanical devices for assisting taking off are also in use.

Wire cutting machine.

Kiln Processes.

Bogie running. P. Light bogies used or number of runners increased.

Dipping (enameling, glazing, putting on slips).

Drawing (emptying).

Setting.

Stacking. Special "steps" introduced. Women often replace boys.

Wheeling. Lighter barrows provided and loads reduced.

Miscellaneous.

Loading into trucks.

CLASS E. — TOBACCO PIPES.

Preliminary Processes.

Preparing the clay. P. A. Women replace apprentices.

Moulding.

Rolling.

Trimming. Women replace apprentices.

Kiln Processes.

Filling boxes (placing in saggers).

Miscellaneous.

Loading up boxes after packing. P. Work has been sectionalized. Women handle the smaller cases.

Training. — In a few of the processes enumerated women cannot be introduced without some training, but in the greater number, only a short period is necessary, and in some practically none at all. Where training is required, as in flowerpot throwing and making of furnace tiles by hand, experienced men over military age are available as teachers.

CHINA AND EARTHENWARE TRADE

OWING to the combination of skill and strength required in many important pottery processes, the field of substitution in the manufacture of china and earthenware has been more limited than in other trades. This field is, however, less narrow than is often supposed, and is gradually being enlarged. Not infrequently it has been found that processes which some manufacturers have considered to be quite beyond a woman's powers were being carried on with complete success by women in the works of other firms. Cases in point are the making of earthenware plates up to 6 and even 8 inch; and tile-pressing up to 6 inch by 6 inch.

Again the difficulty of employing women on heavy work was overcome by mechanical means. Excellent examples of labor-saving appliances have been noted in a number of factories; among them systems of trolley transport on run-ways and various types of lifting tackle.

Potters' Shop (Clay Shop, Making Shop) Processes:

1. Turning.
   (*a*) Old process. Except in the highest class of work.
   (*b*) Automatic process. Special machinery introduced.
2. Hollow-ware Jiggering. Except for large pieces.
3. Hollow-ware Jolleying. Except for large pieces.
4. Hollow-ware Pressing. Direct substitution is not feasible owing to the length of training required, but in a great proportion of the goods made the process is replaceable by casting.
5. Flat Jolleying. Up to 6-inch and 8-inch plates (earthenware).
6. Casting. Can be carried out entirely by women, except in the case of sanitary and other articles involving the use of moulds weighing over 40 lbs.

Oven Kiln Processes.

1. Biscuit Placing. Sectionalizing of work necessary.
2. Dipping. Small and medium-sized articles.
3. Flat knocking. Substitution of machine for hand processes.

4. Glost placing. Sectionalizing of work necessary.
5. Polishing. Small articles.

WAREHOUSE PROCESSES.

Control of orders.
Grading.
Overlooking.
} Women have recently been substituted in more responsible posts.

Slabbing of tiles.
Sorting (selecting).
Testing. Women work under skilled supervision.

DECORATIVE AND ALLIED PROCESSES.

Cranking (boxing) for the kiln (muffle). Introduction of lifts or men carry in.
Printing. Small and medium-sized plates.
Setting-in (placing), and emptying (drawing) the kiln (muffle). Sectionalizing of work and skilled supervision necessary.

MISCELLANEOUS.

Cleaning (washing) boards.
Cleaning floors.
Cleaning mangles.

LITHOGRAPHIC TRANSFER (Ceramic Transfer) MAKING PROCESS.

(*a*) Cleaning stones.
(*b*) Tending coloring machines.
(*c*) Assisting with Litho machines.
(*d*) Tending dusting-off machines.
(*e*) Hand coloring and dusting.
} Already women's processes in most factories.

Training. — In a few of the processes enumerated women cannot be introduced without some training,

of which hollow-ware jiggering and jolleying of the larger-sized flat ware are examples, but in the greater number only a short period is necessary, especially where the women employed have previously done work of a similar character, as in the case of the saucer-maker promoted to plate-making.

SILVER AND ELECTRO PLATE TRADES

IN the silver and electro plate trades it was discovered that processes in which men only are employed in one district are being carried on successfully by women in another district.

A. Preparatory Processes:

(1) Cutting by hand.
- (*a*) Britannia Metal.
- (*b*) Silver.
- (*c*) Nickel (light gauges).

(2) Drop stamping. Automatic lifts can be attached to any belt raised drop stamp. When this is done the heaviest machine can be operated by a woman.*

(3) Power presses. As men are required for carrying the dyes and for tool setting, employment of women is most suitable where there is a large amount of repetition work.

(4) Cross rolling. (Spoons and forks.)

* The contrivance referred to is a friction grip apparatus, not patented, and information can be obtained regarding same from the Textile Department of the Merchants National Bank, Boston, Mass.

(5) Slotting out.
Flying out.
Cutting out.
(Spoons and forks.)

(6) Fork piercing.

(7) Machine filing.
Grinding.
(Spoons and forks.)

(8) Setting. (Spoons and forks.)

B. Silversmithing, Metal Smithing, Making Up:

Women are employed in making up throughout the following articles: paper-knives, buckles, rattles, smelling-salt bottles, silver spoons, button hooks, note-book covers, centre pieces, vases, handles for ladies' bags, sticks and umbrella mounts, cruet tops, egg-cup stands, dinner cruet frames, breakfast cruet frames, caskets, and other similar articles.

They are further employed in the following processes in the making up of hollow-ware and toilet accessories:

(1) Rubbing down.
(2) Fitting rims.
(3) Soldering (hard and soft).
(4) Filing edges.
(5) Handle setting.
(6) Saw piercing.
(7) Fly piercing. Press work.
(8) Engraving.

C. Plating:

(1) Silver plating on nickel or britannia metal.
(2) Silver plating on silver.
(3) Nickel plating on various metals.

In the above processes women can be employed as platers, clerks and assistants to men. In some instances women have been found in sole charge of the plating room, particularly in nickel plating on base metals, where the solution is previously prepared.

D. Polishing:

(1) Buffing.
Sand polishing.

(Spoons and forks — hollow-ware, smaller articles.)

(2) Dollying.
Grease mopping.

(3) Finishing.
Lathe burnishing.

(Spoons and forks — hollow-ware of all sizes.)

Training. — In some of the processes, notably most of those named under the heading "Preparatory Processes," women can be introduced without previous training. In "silver smithing" and "metal smithing" women can be taught some of the processes in a few weeks' time, while for others the period of training is considerably longer; it has been found possible, however, to materially reduce the period required for training by reorganizing the work on the basis of a division of processes among various workers instead of the present system of making throughout by one man. In the plating department the time needed for training would be much decreased if women with a knowledge of chemistry could be obtained for the posts of platers and platers' assistants. In the polishing department women are very useful, working under suitable supervision,

after about six weeks' training. Careful selection has been necessary in this department as the work requires considerable strength and women of strong physique should be chosen where possible.

THE CHEMICAL INDUSTRIES

SUBSTITUTION has begun to some extent in all the principal centres of the chemical industries, but at present is confined to a relatively small number of firms. Owing to the heavy nature of some of the work and to the fact that in the past it has been customary for the same man to be employed on different kinds of work, some too heavy for women, some comparatively light and suitable for women, a certain amount of reorganization and adaptation will be necessary before women are substituted with general success. In another respect the industry is exceptional, in that it affords scope for the employment of specially trained university women (chemists) in the works' laboratories as analysis or research workers.

The following is a list of the processes in which women have already been or can be successfully substituted for men:

A. ALKALI AND ACID MANUFACTURE:

1. *Alkali.* Emptying roll sulphur moulds. No substitution has been found in the process of alkali manufacture proper.

2. *Acid.* Filling, stoppering, and packing carboys. The adoption of women's labor in this work is facilitated by transport of the carboys on hand trucks. With moderate care the dangers of burning from sulphuric acid and of gassing from nitrous fumes in manipulating nitric or nitrous acid can be obviated. (See also under C.)

B. Manufacture of Light Chemicals:

1. *Use of Machines or Mechanical Apparatus.*

(*a*) Filter Press Work.* Scraping and cleaning ordinary filter presses. Suitability depends on the size and material of the press (women are being employed on 40-inch wooden and 37-inch iron presses).

Screwing up, emptying and cleaning gravity filter press.

Working hydraulic press; for example, for compression of guncotton and for oil extracting. For this work a suitable working suit is desirable.

(*b*) Centrifugals or Hydro Extractors.

Loading, working, and emptying centrifugals (up to 50-inch cage diameter).

(*c*) Electro Chemical Processes.

Refining and separation of metals. The adoption of women's labor to any great extent in copper refining depends on the size of the cells and

* In addition to the processes named, inspectors have found women learning to manipulate the pump or valve regulating the flow of liquor.

on the use of lifting tackle when the anodes and cathodes are too heavy.*

Feeding cells with solution.

Removing deposit of precious metals from cells.

Fitting cells with carbons and making plastic parts of cells.

Making cell luting.

(*d*) Management of Stills.

Supervision of water distillation plant.

(*e*) Feeding or Working the following Machines:

Feeding only:

Disintegrator.

Mechanical siever.

Grinder.

Bucket elevator.

Edge runner.

Working:

Band saw.

Using hand, over-head, lifting tackle (for moving drums up to 1 ton in weight).

2. *Manual Processes Other than Warehouse Work.*

(*a*) Laboratory work — skilled and unskilled. Some trained chemists have been employed and unskilled workers are used for simple cleaning operations or for making routine tests.

* The Inspectors consider that women could be satisfactorily employed to a greater extent than has been yet attempted in the management of cells.

(*b*) Emptying cooling or crystallizing tanks.*

(*c*) Breaking up solid crystals (except large blocks requiring the use of a heavy pick or crowbar).

(*d*) Drying cupboard work.
Conveying drying shelves or solids.
Spreading out and raking over solids.

(*e*) Emptying subliming chambers.

(*f*) Stacking blue beds in white lead works (performed in some factories prior to the war).

(*g*) Feeding and supervision of small boiling pans, and of reaction vessels.
Supervision of evaporating tanks.

(*h*) Washing crystals in fine chemical works.

(*i*) Syphoning liquors into crystallizing tanks.

3. *Warehouse Work.*

(*a*) Dry packing generally.†

(*b*) Wet packing.†

* Women have been found employed on coolers (or crystallizing tanks) 5 feet 6 inches deep. Two women emptied and one carried away. A strong type of woman is essential. In one instance women dug out tanks barefoot, in another they wore clogs or boots. One cooler containing over two tons of material would be emptied daily. Women have been employed on borax coolers for years and are considered satisfactory.

It is desired to call the attention of employers to the possibility of employing women on the analogous operation of emptying sulphur tanks in the chance recovery process—in which the work is certainly less arduous than that involved in the above case.

† Technical difficulty in employing new labor on these processes in fine pharmaceutical chemical manufacture can be and has been met by a simple check system by which the worker relies solely on numbers and is not assumed to have any specific technical knowledge.

(*c*) Soldering tins and tin paper linings of cases.

(*d*) Weighing and packing copper ingots.

(*e*) Storekeeping.

(*f*) Checking for dispatch.

C. General Laboring Work:

1. (*a*) Unloading boats and trucks of slack, coal, coke, firebricks, timber, sand, and drain pipes.

   (*b*) Loading barges with coal, etc., and trucks with sacks.

2. Filling and wheeling barrows (loads up to 100 to 200 lbs. including barrow).

3. Wheeling carboy of acids.

4. Washing, rolling, and painting iron drums.

5. Bagging coke, chemical manure, etc.

6. (*a*) Cleaning and emptying evaporating tanks.

   (*b*) General cleaning operations.

7. Trimming coal for furnaces, and leveling ashes.

8. Washing bogies.

9. Breaking up pyrites.

10. Carting.

In addition, women have been found in one or two cases employed in subsidiary trades ancillary to chemical works.

In dry cooperage — on a number of repetition machines.

In basket making — in the mechanic's shop.

In drilling, planing, screwing and mortising.

Training. — The greater part of the operations performed require no special training or skill apart from careful instruction at the works in methods of tackling and of systematically arranging the work. Practice in hard manual labor and strict, intelligent attention to instructions are chiefly necessary. In certain exceptional operations, for example, management of vacuum stills, long experience appears requisite for rapid appreciation and successful control of different combinations of causes which may affect the work, and which it is said to be almost impossible to schedule for the guidance of the new worker.

Special arrangements of a simple and practical character are necessary to render the heavier and more dangerous work suitable for women. A good example of labor-saving arrangements in connection with the loading and unloading of trucks is the erection of rough platforms with access by planks on a gentle incline, which have been found of great service. Other mechanical appliances, such as arrangements for "blowing over" liquors instead of carrying by hand; introduction of lifting tackle where heavy plates, etc., have to be lifted and of lighter implements (barrows, pulleys, spades, etc.); and the provision of suitable protective clothing for wet, dangerous, and dirty processes, have facilitated introduction of women.

COLOR, PAINT AND VARNISH TRADE

RECENT inquiries show that in individual color, paint and varnish factories women are already doing satisfactory work hitherto commonly performed by men in the following processes:

1. Color mixing: Stirring the liquid in the color-mixing vats or becks. Washing accommodation and suitable protective clothing necessary.
2. Grinding: Tending cone mills and roller mills. Removing the paint from the rollers as the grinding proceeds, and in some cases where automatic feed does not exist, feeding the rolls. Cleaning mills when color is changed. Where large vessels are filled one man to every three women meets the difficulty of lifting heavy weights.
3. Packing and filling: Putting dry colors into packets and small tins, and filling small tins of ready-mixed paint. Men lift the heavier loads.
4. Filling Varnish: Tending Roberts' and other filling machines.
5. Press tending: Filling, emptying and cleaning at color presses. Washing accommodation and suitable protective clothing necessary.
6. Sieving: Feeding, minding and taking off machines. Men required to move and lift the heavier loads.
7. Dipping, washing and soldering of tins.

8. Painting kegs and drums.
9. Mounting shade or color cards.
10. Labeling and stenciling of packages.
11. Packing into crates. Lighter articles only.
12. Coopering: Making up small and medium-sized casks. Subdivision of labor necessary. Stripping old casks.

The difficulties arising from the heavy nature of some of the work to be performed can often be overcome by the reorganization of duties. For example, the task of lifting or moving heavy weights can be assigned to men, while women can be employed on the lighter processes.

Training. — Little skill is required in any of the above operations, and a very short period of training suffices.

SUGAR REFINERIES

BEFORE the war, women's work in sugar refineries was limited to the lighter packing and shipping work, and there are certain departments where it is still considered undesirable to employ females, but during the last year they have been introduced into a number of operations as follows:

1. Helping to unload the raw sugar, i.e., wheeling bags of raw sugar, cutting bags open, and assisting men in emptying the same.

2. *In the melting and mixing department; assisting the skilled men, and trucking.
3. *Tending raw sugar centrifugals, i.e., charging, washing and scraping, where the centrifugals are provided with open bottoms. Where women were found not to be capable of all the operations they assisted in the washing process so that a reduced male staff was required.
4. *Washing filter bags or cloths — when carried on in a department separated from the filter presses. This insures that the temperature for the work is reasonable.
5. *Tending refined sugar centrifugals.
6. *Spreading sugar (other than low quality brown sugar) in "boxes."
7. Filling, sewing and wheeling bags of sugar weighing up to 2–3 cwts.
8. In the cube house: tending centrifugals, helping with mould and stove work, minding the cutting machines, weighing and packing.
9. In the making of glucose invert sugar; filling the casks and rolling them to elevators for loading. In some mills they can also fill the glucose moulds.
10. *Washing, mangling, drying and printing raw sugar bags.
11. *Cask washing.
12. Laboratory work.
13. In the engineering shops: repairing metal parts.
14. In wooden box making: all processes.

* The processes thus marked are wet, sticky, dirty or hot, and so require the provision of special clothing, which will help to keep the workers dry, clean and cool.

COMPILATION OF STATE LABOR LAWS RELATING TO FEMALE AND CHILD LABOR

NOTE: The laws are subject to the Federal Child Labor Law of September 1, 1916

STATES	FEMALE LABOR NO. OF HOURS	FEMALE LABOR NIGHT WORK	CHILD LABOR AGE LIMIT	MINIMUM WAGE	REMARKS
ALABAMA	No law	Yes	*1 14	None	
ARIZONA	56	Yes	*1 14	None	
ARKANSAS	54	Yes	14	$6.00 first 6 mos. $7.50 after	
CALIFORNIA	48	Yes	14	Depart. Stores $13.33 per month	
COLORADO	56	Yes	16. *1 14–16	None	New laws pending
CONNECTICUT	55	Yes	14	None	
DELAWARE	55	No	14	None	
FLORIDA	No law	Yes	*3 14	None	
GEORGIA	No law	Yes	14	None	
IDAHO	.....	.....	.....	.....	No laws
ILLINOIS	70	Yes	*1 14	None	
INDIANA	.....	.....	.....	.....	No laws
IOWA	No limit	Yes	14	None	
KANSAS	No law	No law	14	None	New laws pending
KENTUCKY	60	Yes	*1 14	None	
LOUISIANA	60	Yes, 18 yrs. or over	14	None	
MAINE	54	Yes	14	None	
MARYLAND	60	6 A.M. to 10 P.M.	14	None	
MASSACHUSETTS	54	*7 6 A.M. to 10 P.M.	16	None	
MEXICO, NEW	.....	.....	.....	.....	No laws
MICHIGAN	54	No	15	None	
MINNESOTA	*5 54	Yes	.....	.....	
MISSISSIPPI	60	Yes, over 16 years	Male, 12; female, 14	None	
MISSOURI	54	Yes	16	None	
MONTANA	56	Yes	16	None	
NEBRASKA	54	6 A.M. to 10 P.M.	16	None	

COMPILATION OF STATE LABOR LAWS RELATING TO FEMALE AND CHILD LABOR — *Continued*

States	Female Labor No. of Hours	Female Labor Night Work	Child Labor Age Limit	Minimum Wage	Remarks
Nevada	56	Yes	Male, 14; female, 16	.....	.....
New Hampshire	55	Yes	16	None	.....
New Jersey	60	Yes	*1 14	None	.....
New York	54	No	14	None	.....
North Carolina	60	Yes, over 16	12	None	.....
North Dakota	60	Yes	14	None	.....
Ohio	50	Yes, if over 21 yrs.	16	None	.....
Oklahoma	No law	Yes, over 18, females 16, males	16	None	.....
Oregon	50 to 54	Yes	*2 14	*4 $8.25	.....
Pennsylvania	54	No	*1 14	None	.....
Rhode Island	54	Yes	14	None	.....
South Carolina	60	Yes	14	None	.....
South Dakota	60	Yes	14	None	.....
Tennessee	57	Yes	14	None	.....
Texas	60	Yes	15	None	.....
Utah	.....	.....	.....	.....	No laws
Vermont	56	Yes	14	None	.....
Virginia	60	Yes	14	None	.....
Washington	56 8 hrs. per day	Yes	Male, 14; female, 16	Adult, $8.90	New laws pending
West Virginia	No limit	Yes	16	None	.....
Wisconsin	55	*6 Yes	14. 14–17, labor permits	.....	.....
Wyoming	56	Yes	14	None	New laws pending

*1 School certificate required.
*2 Certain age limit for special occupations.
*3 Newsboys, 10 yrs.; day messengers, 12; night messengers, 18; factories, 14, with permit; 16, without permit.
*4 Outside of Portland, Oregon. In Portland, $8.64.
*5 Manufacturing, 54 hrs.; mercantile, 58; manufacturing outside of cities, 58 hrs.
*6 Not in factories or laundries.
*7 Textile industry not after 6 P.M.

CONCLUSION

IN the preparation of this brochure we have secured great assistance from various Industrial Committees and Boards of the British Government, French Industrial Commissioners, special reports received through American Consulates, current foreign and domestic publications touching upon this subject, and several American authorities. Our own original investigations have been thorough, and we have spared no effort to make the facts reliable and accurate.

A few of the terms given in the various industrial operations have not been anglicized; some of the operations may appear unfamiliar to American manufacturers because of the different types of machinery used in Great Britain and France, and the writer frankly concedes the possibility of an honest difference of opinion as to some of the conclusions. If error in fact or statement has crept in, the writer earnestly begs indulgence. The subject is a new one to industrial and economic investigators in this country, but it should increase in importance as the war progresses.

If this country is to do its full share towards winning the war, employers of labor must follow the lead of other industrial nations which have been at war for the last three years and mobilize the woman power of the nation.

In doing this, we should profit by the experience of others gained since 1914.

Of necessity it has not been possible to cover all phases of the subject in so limited a space, but the Textile Department of the Merchants National Bank will welcome correspondence in regard to this important subject and offers its aid in the way of suggestion and information.